## **CONTENTS**

## RAKAKAKAKAKAKAKAKA

Reviewers	V
Contributors	ix
Acknowledgment	XV
Information for Authors	xvii
Editor's Introduction	xix
Review and Renewal of Findings Past	
1. Another Look at the Stratification of Educational	1
Transitions: The Logistic Response Model with Partial	
Proportionality Constraints	
Robert M. Hauser and Megan Andrew	
Response:	
Statistical Models of Educational Stratification—Hauser	27
and Andrew's Models for School Transitions	
Robert D. Mare	
New Methods for Specific Situations: Cohort Models,	
<b>Exponential Graphs, Event Histories, Cluster Studies</b>	
and Logit Analyses	
2. Bayesian Inference for Hierarchical Age-Period-Cohort	39
Models of Repeated Cross-Section Survey Data	
Yang Yang	

and Violence in the Field

A Mixed Models Approach to the Age-Period-Coho Analysis of Repeated Cross-Section Surveys with an	
Application to Data on Trends in Verbal Test Scores	
Yang Yang and Kenneth C. Land	
New Specifications for Exponential Random Graph	99
Models	99
Tom A. B. Snijders, Philippa E. Patt	ison,
Garry L. Robins, and Mark S. Hand	
Fixed-Effects Methods for the Analysis of Nonrepea	ated 155
Events	
Paul D. Allison and Nicholas A. Chr.	istakis
Meaningful Regression and Association Models for	173
Clustered Ordinal Data	
Jukka Jokinen, John W. McDonald, and Peter W. F. Smith	
Measuring and Analyzing Class Inequality with the	Gini 201
Index Informed by Model-Based Clustering	OIII 201
Tim Futing Liao	
Effect Displays for Multinomial and Proportional-C	Odds 225
Logit Models	
John Fox and Robert Andersen	
Survey Design and Analysis	
3. A Partial Independence Item Response Model for S	urveys 257
with Filter Questions	
Sean F. Reardon and	
Stephen W. Raudenbush	
Response Bias in a Popular Indicator of Reading	301
to Children	
Sandra L. Hofferth	
Staying Alive and Other Practical Problems of Data Acqui	isition
4. The Safety Dance: Confronting Harassment, Intimi	
and Violence in the Field	

Gwen Sharp and Emily Kremer





## NAME INDEX

Adalbjarnardottir, S., 260 Adams, R.J., 262 Agresti, A., 174, 175, 178, 180, 190, 192, 193, 194, 195, 196, 197, 198, 199, 251n Albert, R., 114 Allison, P.D., 8, 9, 28, 29, 30, 31n, 156, 159, 259 Altman, D.G., 179 Alwin, D.F., 65, 78, 79, 80n, 89, 93, 94 Andersen, R., 238, 241 Anderson, J.A., 5 Arendell, T., 318, 319, 320, 325 Armenia, H.K., 172 Armstrong, B.G., 259 Ato-Garcia, M., 196 Axinn, W.G., 271n, 297

B
Bachman, J.G., 196, 261
Bailey, S.L., 260
Ballarino, G., 8n
Banfield, J.D., 207
Barab-si, A.-L., 114
Barber, J.S., 271n, 297
Barbour, R.S., 319, 321, 324, 325

Barkema, G.T., 106, 140 Barnard, M., 319, 321, 324, 325 Bashir, S.A., 69 Bates, D.M., 272 Bennett, M.E., 261 Berger, R.L., 51 Besag, J., 102, 103, 105, 106 Best, N.G., 58, 59, 59n Bishop, Y.M.M., 4 Blossfeld, H.-P., 2, 24, 28 Bollen, K.A., 27 Booth, J.G., 198, 199 Bosker, R., 45, 88n Botvin, G.J., 261 Boudon, R., 28 Box, G.E.P., 62n Boyle, P., 40, 76, 77 Bracken, M.B., 179 Breen, R., 4, 5, 29, 35 Brennan, R.T., 271n, 295 Breslow, N., 164n Brooks, C., 5, 24 Browne, W., 62 Brvk, A., 60 Bryk, A.S., 41, 49, 50, 51n, 57, 86, 88, 89, 89n, 94, 273, 275 Buka, S.L., 271n, 295 Burda, Z., 106

Burns, S., 301 Butts, C.T., 108, 149

C Caffo, B., 180, 192, 194, 195, 198, 199 Cameron, A. C., 156 Cameron, S. V., 2, 29, 35 Campbell, J.R., 87 Carlin, B.P., 57, 58, 59, 60n Carlin, J.B., 57, 57n, 60 Casella, G., 51 Catalano, R.F., 260 Chamberlain, G.A., 156 Chang, H.-C., 28 Chassin, L., 260, 261 Cheong, Y.F., 89n, 262, 273, 275 Chmiel, J.S., 172 Chotikapanich, D., 206 Christakis, N.A., 157n Chung, I.-J., 260 Clayton, D., 77 Cleary, S.D., 261 Colder, C.R., 261 Congdon, R., 89n, 273, 275 Cook, J.M., 101 Cowell, F.A., 202 Cowles, M.K., 58 Cox, C., 259 Cox, D.R., 28

D
D'Onofrio, B., 261
Dagum, C., 202, 204, 216
Dasgupta, A., 208
Davies, H.T.O, 179
Davis, J., 304
Davis, J.A., 100
Davis-Kean, P., 304
Deeks, J.J., 179
Detels, R., 172
Diaz, T., 261
DiPrete, T.A., 5
Donnan, P.T., 166

Crombie, I.K., 179

Curran, P.J., 261

Donnelly, N., 196 Draper, D., 57 Duncan, B., 10, 28 Duncan, O.D., 177, 193 Duncan, S.C., 261 Duncan, T.E., 261

E
Eaves, L., 261
Ekholm, A., 175, 176, 179, 181, 185, 191
Erikson, R., 5, 24
Esteve, J., 69
Everitt, B.S., 206

Featherman, D.L., 2, 28, 34 Federal Interagency Forum, 302, 304 Fienberg, S.E., 4, 6, 45, 46, 76, 77, 83 Finklestein, J, 304 Firebaugh, G., 77, 202, 216 Firth, D., 227, 228n Fitzgerald, J., 304 Fitzmaurice, G.M., 178, 193 Flewelling, R.L., 260 Fornell, C., 313 Fox, J., 225, 226, 227, 228, 231n, 232, 234, 241, 253 Fraley, C., 207, 208, 209 Frank, O., 102, 103, 104, 108, 112, 115, 148 Friedman, J., 226 Fu, W.J., 40, 46, 77, 79

G Gamoran, A., 29 Gandini, S., 40, 76 Gange, S.J., 172 Gardner, M.J., 77 Gelfand, A.E., 58 Gelman, A., 57, 57n, 60, 61 Geman, D., 108 Geman, S., 108 Gentleman, R., 253 Geyer, C.J., 104 Gill, F., 319, 324 Gini, C., 202 Glenn, N.D., 41, 65, 76, 77, 78, 79, 80n, 89, 93, 94 Glonek, G.F.V., 178, 193 Goldberger, A.S., 7, 27 Goldstein, H., 60, 61, 62, 87n Goldthorpe, J.H., 5, 24, 29 Goodnight, J.H., 226, 231n Goodreau, S.M., 108, 149 Gottschalk, P., 210, 304 Gove, W.R., 46, 65, 78-79, 80n, 83, 88, 89, 92-93, 94 Green, G., 319, 321, 324, 325 Greenberg, B.G., 79n Greene, W.T., 156 Greenland, S., 159, 162, 165, 166, 179 Gregory, D., 320, 324, 325 Griffin, K.W., 261 Griffin, P., 301 Griffiths, W., 206 Guo, X., 57

H Hagenaars, J.A., 174, 196 Häggströom, O., 106 Halaby, C.N., 156 Hall, W., 196 Hancock, G.R., 313 Handcock, M.S., 105, 106, 108, 109, 114, 115, 126, 148, 149, 150 Hartzel, J., 180, 192, 194, 195 Harvey, W.R., 226, 231n Hastie, T., 226 Hastie, T.J., 248n, 253 Hauser, R.M., 7, 12, 27, 28, 34 Hauser, R.M.L, 2, 34 Hawker, S., 324, 325 Hawkins, J.D., 260 Heath, A., 238 Heckman, J, 83 Heckman, J.J., 2, 29, 35 Hedges, L.V., 87 Hernan, M.A., 166 Hernandez-Diaz, S., 166

Hill, K.G., 260 Hills, S.E., 58 Hobcraft, J., 46, 77 Hobert, J.P., 198, 199 Hoff, P.D., 102, 150 Hofferth, S.L., 301, 304 Holford, T.R., 77 Holland, P.W., 4, 100, 262 Hombo, C.M., 87 Hops, H., 261 Hout, M., 2, 5, 24, 177, 193 Howell, N., 320, 325 Hox, J.J., 86n Huisman, M., 108, 128, 136, 149 Hunter, D.R., 108, 126, 149, 150 Hussong, A.M., 261

Ihaka, R., 253

Inglehart, R.E.A., 247

Iwashyna, T.J., 157n

J
Jackson, R.J., 159
Jamieson, J., 318
Janis, J.M., 79n
Jankowski, M.S., 318
Johnson, C., 262, 272n, 288, 292, 295
Johnson, V., 261
Johnston, L.D., 196, 261
Jokinen, J., 175, 176, 181, 185, 191
Jonasson, J., 106, 130
Jones, J.H., 115
Jonsson, J.O., 4, 5, 29
Jöreskog, K.G., 7
Jurkiewicz, J., 106
Juster, F.T., 305

K Karmous, A., 79n Kaufman, L., 206 Kaufmann, J., 192 Kenny, D.A., 102 Kenyon, E., 324, 325 Khoo, S., 260 King, G., 226 Kitzinger, J., 319, 321, 324, 325 Knight, K., 77 Knorr-Held, L., 69 Kovats-Bernat, J.C., 318 Kreft, I.G., 86N Krzywicki, A., 106 Kupper, L.L., 79n

L Laird. N.M., 178, 193 Land, K.C., 40, 41, 42, 44n, 45, 46, 66, 67, 77, 79 Lang, J. B., 174, 175, 178, 193, 196 Larcker, D.F., 313 Lauderdale, D., 157n Lazega, E., 117, 134, 139, 144 Lehmann, E.L., 105 Leinhardt, S., 100 Liang, K.Y., 193 Liao, T.F., 210 Lindsey, J.K., 195 Lindsey, P.J., 192 Littell, R.C., 47 Little, R.J.A., 180, 297 Liu, J., 202 Long, J.S., 30, 226, 234, 243 Lord, F.M., 258 Lorenz, M.O., 202 Louis, T.A., 58, 60n Lucas, S.R., 2, 28 Lunn, D., 59n

M
Maclean, A., 9
Maclean, C., 319, 324
Maclure, M., 159, 166
Magidson, J., 207
Manski, C.F., 29
Manza, J., 5, 24
Maples, J., 271n, 297
Mare, R.D., 6, 10, 12, 23n, 24, 27n, 28, 29, 30, 35
Margolick, J.B., 172
Marshall, R.J., 159

Mason, W.H., 46, 76, 82, 83 Mason, W.M., 45, 46, 76, 77, 79, 83 Mather, N., 303 Mazzeo, J., 87 McCammon, R.J., 65, 78, 79, 80n, 93, McCrady, B.S., 261 McCullagh, P., 178, 193, 227, 234, 238, 241 McCulloch, C.E., 68 McDonald, J.W., 174, 175, 176, 181, 185, 191 McPherson, M., 101 Menken, J., 46, 77 Meyer, K., 166 Milanovic, B., 202 Milliken, G.A., 47, 226, 231n Mitchell, A.A., 166 Mittleman, M.A., 159 Moffitt, R., 304 Moreno, E., 320 Morenoff, J.D., 263 Morgan, S.L., 29 Morris, C.N., 57n Morris, M., 108, 149 Mueller, R.O., 313 Murphy, S., 271n, 297 Mussard, S., 202, 204 Muthen, B., 260

Mason, K.O., 46, 76, 82, 83

N Natarajan, R., 174, 175, 190, 192, 193 National Center for Educational Statistics, 69 Nelder, J.A., 227, 234, 238, 241 Newman, M.E.J., 101, 106, 140 Nilan, P., 318 Novick, M.R., 258 Nowell, A., 87

O O'Brien, R. M., 77, 83 O'Malley, P.M., 196, 261 Osmond, C., 77

S Pandina, R.J., 261 Sackett, D.L., 179 Park, J., 106 Sampson, R.J., 262, 263, 272n, 288, Paterson, B.L., 320, 324, 325 292, 295 Pattison, P.E., 104, 105, 107, 108, 116, Sandberg, J.F., 301 117, 118, 119, 126, 130, 131, 134, Schadee, H., 8n 148, 150 Schaie, K. W., 65 Peritore, N.P., 320 Scheier, L.M., 261 Pinheiro, P.C., 272 Schifflers, E., 77 Pitts, S.C., 260 Schneeweiss, S., 166 Poole, K., 46, 76, 82, 83 Schneider, M.F., 172 Powers, D.A., 234, 243 Schulenberg, J, 261 Schwartz, J., 202 Powers, W., 164n Preston, S., 46, 77 Schweinberger, M., 108, 128, 136, 149, Prost, J., 260 150 Searle, S.R., 68, 226, 231n R Seltzer, M., 60 R Development Core Team, 191, Seyte, F., 202, 204 Shavit, Y., 2, 24, 28 253 Rachal. J.V., 260 Silberg, J., 261 Sinclair, J.C., 179 Racine-Poon, A., 58 Raftery, A.E., 2, 150, 207, 208, 209 Singer, J.D., 273 Sinnott, R., 238 Rainer, E., 69 Rao, C.R., 237 Sloan, M., 259 Smith, A.F.M., 58 Rasbash, J., 61 Smith, H.L., 46, 79, 94 Raudenbush, S.W., 41, 49, 50, 51n, 57, 86, 87n, 88, 89, 89n, 94, 262, 263, Smith, P.W.F., 174, 175, 176, 181, 185, 191 272, 272n, 273, 275, 288, 292, 295 Smith-Lovin, L., 101 Smithson, M.J., 219 Reardon, S.F., 271n, 295 Snijders, T., 45, 88n Reckase, M., 262 Rijken, S., 35 Snijders, T.A.B., 102, 105, 107, 108, 111, 128, 130, 136, 140, 148, 149, Rinaldo, C., 172 150 Robb, R., 83 Snow, C.M., 301 Robertson, C., 40, 76, 77 Sobel, M.E., 177, 193 Robins, G.L., 105, 107, 116, 117, 118, Spady, W., 28 119, 126, 130, 131, 148, 150 Speed, F.M., 226, 231n Robins, J.M., 159 Spiegelhalter, D.J., 59, 59n Robinson, J.P., 305 Stafford, F.P., 305 Rodrigo, M.F., 196 Roeder, K., 209 Steglich, C.E.G., 108, 128, 136, 149 Rousseuw, P.J., 206 Stern, H.S., 57, 57n, 60 Rubin, D.B., 57, 57n, 60, 180, 297 Stice, E., 261 Rutter, M., 261 Ryder, N.B., 76, 93 Stolzenberg, R.M., 26

Strauss, D., 102, 103, 104, 105, 112, 115, 148 Stroup, W.W., 47 Sturmer, T., 166 Suissa, S., 162, 163, 166 Szelenyi, S., 210

T Tantrum, J., 150
Tavakoli, M., 179
Terraza, M., 202, 204
Thomas, A., 59n
Thompson, E.A., 104
Thorne, S., 320, 324, 325
Tiao, G.C., 62n
Tibshirani, R., 226
Tibshirani, R.J., 248n
Tierney, L., 108
Tilley, J., 238
Tomz, M., 226
Trivedi, P.K., 156

V van der Linde, A., 59 van Duijn, M.A.J., 111 Verkuilen, J., 219 Vermunt, J., 207 Vermunt, J.K., 174, 196 Vines, S.K., 58

W Wadsworth, K.N., 261 Wainer, H., 262 Wang, J., 166 Wang, W.C., 262 Wasserman, L., 209 Wasserman, S., 104, 105, 108, 148 Watts, D.J., 131 Weisberg, S., 226 Werler, M.M., 166 White, H.R., 260 Willett, J.B., 273 Wills, T.A., 261 Wilmoth, J.R., 77 Wilson, J.A., 46, 65, 78-79, 80n, 83, 88, 89, 92-93, 94 Wilson, M.R. 262 Winsborough, H.H., 46, 76, 82, 83 Winship, C., 30, 202 Wise, D.A., 29 Wittenberg, J., 226 Wolfinger, R.D., 47 Wong, W., 60 Woodcock, R., 303 Woolcock, J., 105, 107, 126, 130, 131

X Xie, Y., 5, 234, 243

Y Yamaguchi, K., 156 Yang, M.-L., 272, 275 Yang, Y, 40, 41, 42, 44n, 45, 46, 66, 67 Yang, Y., 40, 46, 77, 79 Yao, S., 202 Yitzhaki, S., 202, 204 Yosef, M., 272, 275

Z Zeger, S.L., 193 Zhang, J., 157n

## SUBJECT INDEX

note: t = table; f = figure

A

activity effect, 144

age effects, 64-65, 76. See also age-period-cohort

analysis

age-period-cohort

accounting/multiple classification model. See age-period-cohort analysis (APC)

age-period-cohort analysis (APC), 75–94

development, 76-77

of finite time period data, 40-41

GLMM-based models, 68-69

goal of, 76

hierarchical (See hierarchical age-period-cohort analysis)

identification problem, 76-77

mixed models approach, 75-94

of repeated cross-section surveys, 77

verbal test scores, 78–82 Akaike's information criteria (AIC),

47, 59, 184-185, 194

alcohol use

dimensionality, empirical assessment of, 289-295

latent, person-specific estimates of, 276–277

alternating independent two-path distributions, 122–125, 143

alternating k-star distribution, 122, 124

geometric, 113

graph from, 127-129

in-k-star combinations, 142-143

mean number of edges and, 128–130 number of edges and, 128

number of edges and, 128

out-k-star combinations, 142–143 with parameter  $\lambda$ , 113

alternating k-triangle

alternating independent two-paths

and, 122-126

applications, 137, 138, 140

edge-plus model, 132-133

new specifications for, 129–133 positive effect, 146

transitive, 143

APC. See age-period-cohort analysis arcs, 142

association model, 181-182

Australian poverty reduction efforts, model of cross-national attitude differences. 247–252 autocorrelation plots, 58, 71 avalanche effect, 110, 111

B

Bayesian inference, for hierarchical APC models, 55–69
Gibbs sampling, 55–60
MCMC estimation, 55–60
prior sensitivity analysis, 60–63
Bayesian information criterion (BIC), 208–209

Bayesian information estimates, 286–287

Bayes-MCMC methods, 56–58 Bayes posterior variance, 285 Bernoulli graphs, 103, 106, 114, 127–128, 132, 133

BIC (Bayesian information criterion), 208–209

binary factor, latent, 182, 183 binary logit model, effect displays for, 228–232

binary response models, 29–30 Britain, political knowledge and party choice analysis, 238–242 broken family (BROKEN), 11, 14, 15

0

Canadian occupational prestige, linear model of, 232–234 case-crossover method description of, 158–161

vs. case-time-control method, 167–168

case-time-control method description of, 163–166 with time-varying covariates, 169 vs. case-crossover method, 167–168 categorical predictors, effect displays

and, 229, 231n CCREM (cross-classified random effects models), 40, 42–47

CD (conditional dependence), 116, 119, 121, 126

cell phones, for field work, 324-325

change statistics, 108–110, 113–114, 121–122

Child Development Supplement, to Panel Study of Income Dynamics, 303–304

class inequality

definition of, 215–216 vs. individual inequality, 202, 215–222

cluster analysis

model-based (See model-based cluster analysis)

of ordinal data (*See* clustered ordinal data analysis) purpose of, 206

clustered ordinal data analysis, 173–197

combined marginal, transition and random-effects models, 196

on government spending opinions, 180–185

marginal models, 192–194 marginal regression, 180 maximum likelihood estimation, 190–191

mean parametrization, 175–178 null association, 181 proportional odds, 180 random-effects models, 194–196 on teenage marijuana use, 185–190 transition models, 191–192

CODA (Convergence Diagnostics and Output Analysis), 58

cohort effects. See also age-period-cohort analysis defined. 76

estimated, 64-65

combined regression and association model

of government spending opinions, 180–185

o teenage marijuana use, 185–190 conditional dependence (CD), 116, 119, 121, 126 conditional maximum likelihood. 159-160 "conditional severity," 271 conditional univariate probabilities, 181 Consumer Price Index. 11 continuation ratio model, 271n Convergence Diagnostics and Output Analysis (CODA), 58

core-periphery network structure, 101 couple mortality prediction case-crossover method, 167-168 case-time-control method, 163-168 nonzero effect of treatment, 168-169 simulation results, 166-169

covariates

dichotomous, 182 effect of, 144, 146 population-averaged effects, 192 Cox proportional hazards model, 160 Cox regression program, 160

CPS (Current Population Survey), March 1973 supplement. See Occupational Changes in a Generation Survey

cross-classified random effects models (CCREM), 40, 42-47

Current Population Survey (CPS), March 1973 supplement. See Occupational Changes in a Generation Survey

D

decomposition methods, for Gini index, 216-217

degeneracy, transitivity models and, 115-116, 129, 131

degree counts, geometrically weighted, 112-114

degree-dependent statistics, 125 degree frequencies, 114 degree of node, 103

dependence ratios joint probability and, 197

density of graph, 125

in marginal model, 192-193 for profile probabilities, 180-181 properties of, 178-180 second-order, 176, 187, 188 Deviance Information Criterion

(DIC), 59 DIC (Deviance Information

Criterion), 59 differential item functioning test (DIF

test), 262, 289, 292-294 dimensionality, of latent characteristics, 288-295 association of covariates, 289 correlation matrix, 288

definition of, 261-262 differential item functioning, 289 substance use, empirical assessment of, 289-295

directed relations, exponential random graph models of, 141-150

Dirichlet-distributed propensities, latent, 182-184

Dirichlet distribution, 182-184 discrete-time hazard model, 29, 271n,

with Rasch model (See partial independence item response model)

drm. 191

Duncan Socioeconomic Index for Occupations, 10-11 dyadic selection processes, homophilous, 101

dyads, 142

edge-plus-alternating-k-triangle model, 132-133

educational attainment of father, 11, 13, 15 of mother (See mother's education) OCG survey data, 11-12 as process in time, 28 school progression ratios and, 28

27-35 educational transitions linear probability modeling, 2 models logistic response (See logistic response models) multiple factors in, 29 significance of, 28 social processes and, 28-29 unrestricted, 30-31 OCG survey data, 11-12 person-transition records and, 6-7 social background and, 12-14 socioeconomic background effects, 7 effect displays for binary logit model, 228-232 computation of, 253-254 estimated population marginal means as, 226 for generalized linear models, 227-233 least-squares means as, 226 for linear model, 232-234 for multinomial logit model, 234-241 for proportional-odds logit models, 241-252 purpose of, 226, 253 ERGM. See exponential random graph model estimated population marginal means, 226 exponential random graph model (ERGM), 102-108 alternating independent two paths, asymptotical distributions, 106 change statistics, 108-110 correlation between Lazega's lawyers, 134-141 directed relations, 141-150 discussion, 147-150

friendship relation, 144-146

geometrically weighted degrees and

educational stratification models, 4-6,

related functions, 111–115
Gibbs sampling, 108–110
independent two-path distributions, 133–134
k-stars, 109, 110–111
modeling transitivity by alternating
k-triangles, 115–122
new specifications, possibilities with, 126–134
parameter sensitivity, 139–141
phase transition, 106–107
of transitivity in networks, 125–126

of transitivity in networks, 125-126 F family background, effect on school progression, 28 family income (FAMINC), 11, 13, 15 farm background (FARM), 11, 14, 15 father's education (FED), 11, 13, 15 father's occupational status (FASEI), 10-11, 13, 15 FED (father's education), 11, 13, 15 fieldwork safety, 317-326 increasing, strategies for, 323-326 literature review, 317-321 personal experience, 321-323 filter items, 257 Fisher information, 286 fitted log-linear models, 193 fitting models, to sparse data sets, 197 five-triangle, 118 fixed effects likelihood, for partial independence item response model, 270-271 fixed effects model, 271 fixed-effects regression methods, 155-171 case-crossover, 158-161 case-time-control design, 163-166 couple mortality application, 156-163 discussion, 169-171 example, 156-158

limitations of analyses, 162

using simulated data, 166-169

four-cycle dependence structure, 123 France, model-based cluster analysis of income inequality in, 209–215, 219–222

friendship modeling, 144–146 fuzzy set theory, 218–219

G

"gate" item, 262-263

gate matrix, 265-268, 290

Gelman-Rubin convergence diagnostic plots test, 58, 70

Generalized Linear Mixed Effects Model (GLMM), 68–69

generalized linear models, effects displays for, 227–233

General Social Survey (GSS), 41, 77 birth cohorts, 41, 43, 45–46 verbal ability data, 41–45, 50–55

geometrically weighted degrees counts, 112-114

decreasing distribution assumption,

distributions, 125, 127-129

in-degrees, 142

out-degrees, 142, 143
geometric alternating *k*-star
distribution, 113

Gibbs sampling

change statistics and, 108–110 conditional distributions, 69 for hierarchical APC models, 55–60

Gini index (Gini inequality ratio)
alternative method (See

model-based cluster analysis) between-group differences, 217–221 decomposition methods, 216–217,

definition of, 203-204

of distribution with six data points, 204–206

formulas, 204

limitations of, 201-203, 222

Lorenz curve (See Lorenz curve) mean difference, 204

relative insensitivity of, 205–206 GLMM (Generalized Linear Mixed

Effects Model), 68-69

government

poverty reduction efforts, model of cross-national differences in attitude, 247–252

spending, opinions on, 180-185

graphs

from alternating *k*-star distribution, 127–129

Bernoulli (See Bernoulli graphs)

definition of, 102 density of, 125

exponential random (See

exponential random graph model)

k-triangle, 132

Markov (See Markov random graph model)

nondirected, 109–110, 120, 126 partial conditional independence

model, 116–119 probability distribution for, 102 random, 102

total number of ties and, 107

GSS. See General Social Survey

H

Hammersley-Clifford theorem, 103, 117

HAPC. See hierarchical age-period-cohort analysis hazard ratio, 158

hierarchical age-period-cohort analysis (HAPC)

Bayesian inference for, 55–69

CCREM, 40, 42–47

data, 41-42

development of, 40

Gibbs sampling, 55-60

identification problem, 46

Monte Carlo simulations, 50-55

REML-EB estimation, 40–41, 47–50 variables, 41–42

hierarchical linear models (HLM), 77

hierarchical necessary factors, 186–187, 197 higher-order terms, 227 HLM (hierarchical linear models), 77 Hungary, model-based cluster analysis of income inequality in, 209–216, 219–222

income inequality, model-based cluster analysis of, 209-215 independent two-path distributions alternating, 122-125, 143 description of, 133-134 inequality class, 215-216 income, model-based cluster analysis of. 209-215 individual vs. class, 202, 215-222 measures of, 201-222 inequality of educational opportunity model, 28 interpretation, of dependence ratio, 178 invariance, dependence ratio and, 179 Ising models, 140 item bias, 262 item conditional severity estimates, 277-280 item structure, for partial independence

J joint probability, 197

K k-independent two-paths, 123–125 k-star alternating (See alternating k-star distribution) counts, 112 degree distributions, 112–113 exponential random graph distribution and, 109–111 Markov graph, 103 k-triangle

item response model, 265-268

alternating (See alternating k-triangle)
counts, 119, 120
four-cycle dependence structure, 123
higher-order, downweighting of, 122
low-density and higher-density
graphs, 132
modeling, 111, 117–118
number of, 119–120

latent binary factor, 182, 183 latent Dirichlet-distributed propensities, 182-184 latent trait models, 260, 262-263, 295-298 latent variable models, 197, 258 least-squares means, 226 linear model, of Canadian occupational prestige, 232-234 logistic response models, 2-4 advantages/disadvantages, 4-5 applications, 27 with partial proportionality constraints (See LRPPC model) with proportionality constraints (See LRPC model) traditional, replication of, 12, 14, 15 logit models binary, effect displays for, 228-232 exponentiation of coefficients in, multinomial, effect displays for, 234-241 proportional-odds, effects displays for, 241-252 log-linear models, 5

for, 241–252
log-linear models, 5
log-multiplicative layer model, 5
log-odds ratio parameters, conditional, 193
log-transformation, for model-based cluster analysis, 213–215, 219, 221
Lorenz curve, 202, 203, 206, 210
LRPC model (logistic response models with proportionality constraints)

identification problem, 30, 34–35 restrictions, 33–34 validity, normalizing restrictions and, 31–33 vs. MIMIC model, 7–8 LRPPC model (logistic response models with partial proportionality constraints) description of, 8–10 of educational transitions, 14, 16–24 identification problem, 30, 34–35 validity, normalizilng restrictions and, 31–33

M

MAR (missing at random), 180, 191 marginal frequencies, of marijuana use, 185–186

marginal models

for clustered ordinal data, 192–194 with transition and random-effects models, 196

marginal probabilities, 197 marginal regression model, 180 marginal severity estimates, 277–280 marijuana

dimensionality of use, empirical assessment of, 289–295 possession arrests, binary logit model of, 228–231

Markov association model. See Markov random graph model Markov chain, definition of, 108

Markov chain Monte Carlo (MCMC) applications, 136–141 directed relations, 145–147 for ERGMs and parameter

estimation, 105 Gibbs sampling and, 55–60

WinBUGS program and, 68 Markovian dependence, 105, 126

Markov random graph model advantages of, 102–103 change statistic, 109–110

k-triangle, 131

for longitudinal studies, 197 of teenage marijuana use, 187–190 transivity parameters, 115–122, 125 triangles, 132, 133 triangle with negative star parameters, 130–131 triangle without star parameters, 129–130, 131

Markov structure, 185–186 masculinity research, 321–322 maximum likelihood estimation (ML), 105, 177

binary logit model, 229–230 for clustered ordinal data, 190–191 model-based clustering method, 207 MCLUST software, 209, 210

MCMC. See Markov chain Monte Carlo

mean parameters, 176 mean squared errors (MSE), 67–68 Metropolis-Hastings algorithm, 108,

126, 136 MIMIC (multiple indicator, multiple cause) model, 7–8, 10, 27 missing at random (MAR), 180, 191

ML. See maximum likelihood estimation

model-based cluster analysis, 202, 206–209

advantages of, 201, 207 basic specifications for, 207 density estimation, 209 of income inequality, 209–215 log-transformation for, 213–215, 219, 221 maximum likelihood form, 207

selection of model, 208–209 uncertainty of classification, 209 Monte Carlo Markov Chain (MCMC),

Monte Carlo Markov Chain (MCMC) 56–57

Monte Carlo maximum likelihood estimates, 128

Monte Carlo simulations, 50–55, 67–68 mother's education, 11, 13, 15, 313 MSE (mean squared errors), 67–68

multinomial logit models, effect displays for, 234-242 multinomial models, 5 multiple-indicator-multiple cause model (MIMIC), 7-8, 10, 27 multiple item analysis, 261-262

National Assessment of Educational Progress, 69

National Institute of Child Health and Human Development (NICHD),

necessary factors, hierarchical, 186-187, 197

NICHD (National Institute of Child Health and Human Development), 304 node degrees, functions of, 114-115

node-level-effects, 100-101 nondirected graphs, 109-110,

120, 126 non-parametric random-effects

models, 195 nontransitive null model, 100

Norway poverty reduction efforts, model of cross-national attitude differences, 247-252

null association model, 181-182

0

Occupational Changes in a Generation Survey (OCG) importance of, 2 men, 12, 14 replicating/extending logistic response models with, 10-24, 34 response rate, 10 school continuation, 12, 14, 15 second, 28 social background characteristics, 10-11, 13

OLS, 58 1-triangles, 120 order of the k-triangle, 118 ordinal data, cluster analysis of. See clustered ordinal data analysis ordinal scale, 174

Panel Study of Income Dynamics (PSID), Child Development Supplement, 303-304 parametric random-effects models, 195 parametrization definition of, 175-177 illustration of, 177-178

parents. See also mother's education father's education, 11, 13, 15 reading to children (See reading to children)

parsimonious model, 192 partial conditional independence graph models, 116-119 partial independence item response

model, 257-298 applications, 259

background and significance, 260-263

computing item and survey information, 285-287 definition of, 258

development of, 258-259 dimensionalilty assessment, 288-295 empirical example, 273-287

fixed effects likelihood, 270-271 gate matrix, 265-268

item conditional severity estimates, 277-280

item structure, 265-268 marginal severity estimates, 277-280 notation, 268-270

observed vs. predicted item conditional and marginal probabilities, 280-285

person-specific item conditional and marginal probabilities, 280 quantities of interest, 258-259

random effects likelihood, 272-273 sample and data, 263-265

period effects, 64, 65, 76. See also age-period-cohort analysis person-specific item conditional and marginal probabilities, 280 PHDCN (Project on Human Development in Chicago Neighborhoods), 263-265 p\* models. See exponential random graph model Pochhamer's symbol, 115 political knowledge and party choice analysis, in Britain, 238-242 popularity effect, 144 prior density, 57n probability distribution cumulative, 244 degenerate, 105-106 Project on Human Development in Chicago Neighborhoods

proportionality constraints, 6–10, 29 proportional-odds logit models, effects displays for, 241–252 proportional odds model, 180 pseudo-likelihood estimation method.

(PHDCN), 263-265

103–104, 105, 109
PSID (Panel Study of Income
Dynamics), Child Development
Supplement, 303–304

R

random effects likelihood, for partial independence item response model, 272–273 random-effects models

for clustered ordinal data, 194–196 with transition and marginal models, 196

random graphs, 102 range, of dependence ratio, 179 Rasch model, 263

alternatives, 295 fixed effects, 271 item independence, 285 risk set for each item, 286n

vs. partial independence item response model, 298 reading to children analysis plan, 307 child vocabulary and, 313 demographic variables, measurement of, 306-307 multivariate analysis, 310-311 national estimates of, 308-310 parents and, 301-303 prediction of verbal achievement and, 311-313 response bias in, 314-315 school preparation and, 301-302 stylized questions on, 304-305 time diaries, 305-306 time measurement, 312-313 regression coefficients, 192 regression estimates, from random-effects models, 195-196

regression model, without explanatory variables, 192 relative risk, 179, 197 REML (restricted maximum

likelihood), 59, 66, 67 REML-EB (restricted maximum likelihood-empirical Bayes), 40-41, 47-50, 58

researcher-subject interaction avoiding dangerous situations, 324 cell phones and, 324–325 gender and, 317–318 professional dress and, 324 rural interviews and, 322–323 safety considerations, 324–326 sexual harassment/intimidation, 319–320

violence/intimidation, 319–321 restricted maximum likelihood (REML), 59, 66, 67

restricted maximum likelihood-empirical Bayes (REML-EB), 40-41, 47-50, 58 R language, 209, 210 rural interviews, researcher-subject interaction and, 322–323

S

SAS macro program, 68 SAS PROC LOGISTIC, 165n SAS PROC MIXED, 58

saturated models, for degree sequence,

school

continuation, social background characteristics and, 2–4, 12, 14, 15 preparation, reading to children and, 301–302 transitions (*See* educational

transitions) school progression ratios, 28

self-organization, 101 SES (socioeconomic status), 292n siblings, number of (SIBS), 11, 13, 15 SIENA program, 128, 132, 133, 136,

single-item analysis, 260–261 social background characteristics, 28 effects on school transitions, in binary response models, 29–30 school continuation and, 2–4, 12, 14,

social inequality analysis, attributes for, 206

social selection, 101

social stratification research, 2

social ties, 101

socioeconomic background factors, 30

Southern birth (SOUTH), 12, 14, 15

S-Plus language, 209 stereotype model, 8

stereotype regression model, 5

stochastic algorithm, 136

stochastic models, 100, 102 stochastic parents, 59n

structural balance effect, 101

stylized questions, on reading to children, 304–305

substance use

dimensionality, empirical assessment of, 289–295

marijuana possession arrests, binary logit model of, 228–231

models for teenage marijuana use, 185–190, 196–197

partial independence item response model, 273–287

PHDCN sample and data, 263–265

single-item analysis, 260–261 Sweden poverty reduction efforts, model of cross-national attitude differences, 247–252

T

teenage marijuana use, models of, 185-190, 196-197

three-triangle, 118, 119

ties, 141

time diaries, 305-306

time-invariant variables, control in case-crossover method, 158–161

Toronto arrests for marijuana possession, binary logit model of, 228–231

transition models

for clustered ordinal data, 191-192

educational (See educational transitions, models)

with marginal and random-effects models, 196

transition probability, dependence ratio and, 179–180

transitivity, 100-102

effect of, 145

modeling by alternating *k*-triangles, 115–122

models, degeneracy and, 115–116, 129, 131

partial conditional independence and, 107-109

two-star model

two-triangle, 118

t-ratios, 136–137
triad closure, 100
triad count, 125
triangles, 106
five-triangle, 118
k-triangle (See k-triangle)
with negative star parameters, 130–131
three-triangle, 118, 119
1-triangles, 120
two-triangle, 118
without star parameters, 129–130, 131
triangulation, 101

U uniform differences model, 5

V
VEI, 208
verbal ability
achievement predictions, reading to
children and, 311–313
Bayesian model for, 56

WinBUGS program, 57, 59, 68

Y
Yule distribution to degree
distributions, 115